

## PROJECT TITLE:: CGPA CALCULATOR

### TEAM :

- 🕒 Sumit Mhaske 221080045
- 🕒 Yash Patil 221080057

### PROBLEM STATEMENT :

**“VJTI GPA Calculator ”**

Design and implement a GUI-based GPA (Grade Point Average) calculator for students of Veermata Jijabai Technological Institute (VJTI). The GPA calculator should allow students to input their course details, including course title, course code, credit hours, and grades obtained, for multiple semesters. The calculator should provide real-time calculation of the Cumulative Grade Point Average (CGPA) based on the entered information.

### MOTIVATION:

Our project is specifically tailored to address the intricacies of the VJTI grading system, offering a GPA calculator designed for the unique academic structure of our college. Calculating GPA can often be a perplexing process for students, and our tool aims to provide a straightforward solution. It serves as an invaluable resource for verifying, predicting, and comprehensively analyzing GPA scores for each semester.

The GPA calculator is a crucial tool for students, offering insights into their academic performance across various courses. It facilitates a deeper understanding of individual strengths and areas for improvement, helping students make informed decisions about their future academic endeavors. Additionally, the tool allows for a comparative analysis of GPA scores among students, fostering healthy competition and motivating individuals to enhance their performance.

Moreover, the GPA calculator is not only beneficial for students but also serves as a valuable resource for the university administration. It streamlines the process of calculating and managing students' GPAs, providing a secure database for storing and organizing data. The ability to clear unnecessary data ensures efficient data management for the university.

In essence, our online GPA calculator is a collaborative effort to empower both students and the university administration. By facilitating data input, generating insightful graphs, and utilizing databases to store and analyze student data, the tool aims to enhance the overall academic experience at our university.

### METHODOLOGY:

Python files created :

- a) Cgpa.py : contain cgpa class
- b) Mysql.py : to create mysql database and table
- c) Main.py : contain data collection methods and logic for calculation

To create our Project **“VJTI GPA CALCULATOR”** we have used an Object Oriented Programming approach to keep different methods sorted and easier to program. It provided us a means of structuring programs so that properties and behaviors are bundled into individual objects.

*libraries*

*global variables, lists*

*class gpa:*

*\_\_init\_\_(self):*

*#create basic gui window*

*#call the methods*

*create methods*

*VJTI\_Image()*

*Title()*  
*CreateLabel1()*  
*CreateLabel2()*  
*.Formula\_Label()*  
*PieChartLabel()*  
*CreateLabel3()*  
*CreateLabel4()*  
*CreateLabel5()*  
*CalculateButton()*  
*Buttons\_Labels()*  
*ClearButton()*  
*.SaveButton()*  
*NextButton()*  
*widgetcommands()*  
*CalculateButton()*  
*SaveButton()*  
*NextButton()*  
*ClearButton()*  
*Calculate\_command()*  
*Save\_command()*  
*Clear\_command()*  
*Next\_command()*  
*askSaveConfirmation()*  
*askClearConfirmation()*  
*askClearBoxesConfirmation*  
*askClearLastEntryConfirmation ()*  
*clearlastentry()*  
*clear\_entries()*  
*Pie\_Chart()*

*Bar\_Graph()*

*run()*

```
if __name__ == "__main__":  
    cal = gpa()    #cal object of class gpa  
    cal.run()
```

The above is the basic layout of our overall code and method used throughout the code.

Firstly, we installed and imported all the required libraries. Then, using tkinter we created a GUI window and created an attractive layout by using widgets of tkinter such as Label, labelframe, entry, button and many more. We also embedded image of Vjti logo and name at the top in the gui window.

After designing the layout and placing all the widgets we created a database and also a table in that database to store the entries of the students.

Then to add functionality we fetch the data from the database and used it to plot a bar graph using matplotlib library to compare gpa of all students.

Used Exception Handling to handle all the errors done by the user while entering the data.

Further, we added a pie graph to get comparative percentage wise performance in each course.

We are planning to add more functionalities to this project which are discussed later in the report.

## **PSEUDOCODE :**

```
# Import necessary libraries  
import tkinter as tk  
import sqlite3  
import numpy as np
```

```
import matplotlib.pyplot as plt

from tkinter import messagebox

# Global variables for storing course information
grade1 = []
grade1point = []
credit1 = []

# Class definition for GPA calculator
class GPA:

    # Constructor method to initialize the GUI
    def __init__(self):
        # Initialize Tkinter window
        self.window = tk.Tk()

        # Set window properties
        self.window.geometry('850x600+350+80')
        self.window.configure(bg="cornsilk")
        self.window.title("VJTI GPA CALCULATOR")

        # Initialize and configure GUI components
        self.Title()
        self.CreateLabel1()
        self.CreateFrame2()
        self.CreateFrame3()
        self.CalculateButton()
        self.ClearButton()
        self.SaveButton()
        self.NextButton()
        self.widgetcommands()

    # GUI component methods
```

```
def Title(self):  
    # Code for creating and placing the title label  
  
def CreateLabel1(self):  
    # Code for creating and placing labels and entry widgets for student information  
  
def CreateFrame2(self):  
    # Code for creating and placing entry widgets for course details in a frame  
  
def CreateFrame3(self):  
    # Code for creating and placing labels for displaying CGPA  
  
def CalculateButton(self):  
    # Code for creating and placing the Calculate CGPA button  
  
def ClearButton(self):  
    # Code for creating and placing the Clear button  
  
def SaveButton(self):  
    # Code for creating and placing the Save button  
  
def NextButton(self):  
    # Code for creating and placing the Next button  
  
def widgetcommands(self):  
    # Code for configuring command functions for buttons  
  
def calculate_command(self):  
    # Code for handling the calculation of GPA based on user input  
  
def clear_command(self):
```

```
# Code for clearing the input fields

def save_command(self):
    # Code for saving student data to a SQLite database

def askClearConfirmation(self):
    # Code for asking confirmation before clearing data

def clear_entries(self):
    # Code for clearing all entries and data

def next_command(self):
    # Code for displaying data in a new window

def Bar_Graph(self):
    # Code for creating and displaying a bar graph using Matplotlib

def run(self):
    # Code to run the Tkinter main loop

# Main program
if __name__ == "__main__":
    # Create an instance of the GPA class
    cal = GPA()
    # Run the GPA calculator application
    cal.run()
```

## OUTPUT :

### I. Initial window

VJTI GPA CALCULATOR

CGPA CALCULATOR

Name:

Registration Number:

Course Title	Course Code	Credit	Grade Obtained
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Your GPA is:  
**0.0**

Calculate CGPA

CLEAR

SAVE

DATA

### I. Enter the data

VJTI GPA CALCULATOR

CGPA CALCULATOR

Name:

Registration Number:

Course Title	Course Code	Credit	Grade Obtained
<input type="text" value="LA"/>	<input type="text" value="R4MA2007S"/>	<input type="text" value="4"/>	<input type="text" value="AA"/>
<input type="text" value="DM"/>	<input type="text" value="R4IT2001S"/>	<input type="text" value="4"/>	<input type="text" value="AA"/>
<input type="text" value="COA"/>	<input type="text" value="R4IT2004S"/>	<input type="text" value="3"/>	<input type="text" value="AB"/>
<input type="text" value="DSL D"/>	<input type="text" value="R4IT2003S"/>	<input type="text" value="3"/>	<input type="text" value="AB"/>
<input type="text" value="FDS"/>	<input type="text" value="R4IT2002T"/>	<input type="text" value="3"/>	<input type="text" value="AA"/>
<input type="text" value="PD"/>	<input type="text" value="R4IT2005A"/>	<input type="text" value="2"/>	<input type="text" value="AB"/>

Your GPA is:  
**0.0**

Calculate CGPA

CLEAR

SAVE

DATA



## II. CGPA displayed on clicking the Calculate CGPA button.

VJTI GPA CALCULATOR

### CGPA CALCULATOR

Name:  Registration Number:

Course Title	Course Code	Credit	Grade Obtained
<input type="text" value="LA"/>	<input type="text" value="R4MA2007S"/>	<input type="text" value="4"/>	<input type="text" value="AA"/>
<input type="text" value="DM"/>	<input type="text" value="R4IT2001S"/>	<input type="text" value="4"/>	<input type="text" value="AA"/>
<input type="text" value="COA"/>	<input type="text" value="R4IT2004S"/>	<input type="text" value="3"/>	<input type="text" value="AB"/>
<input type="text" value="DSL D"/>	<input type="text" value="R4IT2003S"/>	<input type="text" value="3"/>	<input type="text" value="AB"/>
<input type="text" value="FDS"/>	<input type="text" value="R4IT2002T"/>	<input type="text" value="3"/>	<input type="text" value="AA"/>
<input type="text" value="PD"/>	<input type="text" value="R4IT2005A"/>	<input type="text" value="2"/>	<input type="text" value="AB"/>

Your GPA is:

**9.58**

Calculate CGPA

CLEAR SAVE DATA

## III. Saves the data to the database on clicking the 'Save' Button.

VJTI GPA CALCULATOR

### CGPA CALCULATOR

Name:  Registration Number:

Course Title	Course Code	Credit	Grade Obtained
<input type="text" value="LA"/>	<input type="text" value="R4MA2007S"/>	<input type="text" value="4"/>	<input type="text" value="AA"/>
<input type="text" value="DM"/>	<input type="text" value="R4IT2001S"/>	<input type="text" value="4"/>	<input type="text" value="AA"/>
<input type="text" value="COA"/>	<input type="text" value="R4IT2004S"/>	<input type="text" value="3"/>	<input type="text" value="AB"/>
<input type="text" value="DSL D"/>	<input type="text" value="R4IT2003S"/>	<input type="text" value="3"/>	<input type="text" value="AB"/>
<input type="text" value="FDS"/>	<input type="text" value="R4IT2002T"/>	<input type="text" value="3"/>	<input type="text" value="AA"/>
<input type="text" value="PD"/>	<input type="text" value="R4IT2005A"/>	<input type="text" value="2"/>	<input type="text" value="AB"/>

Your GPA is:

**9.58**

Calculate CGPA

CLEAR SAVE DATA

Saved

Data Saved Successfully..!!!

OK

**IV. Shows a stored record window by fetching data from the database on clicking the “ Data” button .**

Data

Clear ALL data Show Graph

Name	Reg no.	CGPA
sumit	221080045	9.16
yash	221080057	9.76
sumit mhaske	231081111	9.19
Riddhi Dapke	221081012	7.29
Gaurav Jadhav	221080022	6.35
aachal	221080000	3.33
aditi	221070090	9.31
Yash Patil	221080058	9.58

**Clear Button' to reset the window for new entry.**

VJTI GPA CALCULATOR

## CGPA CALCULATOR

Name:  Registration Number:

Course Title	Course Code	Credit	Grade Obtained
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Your GPA is:

9.58

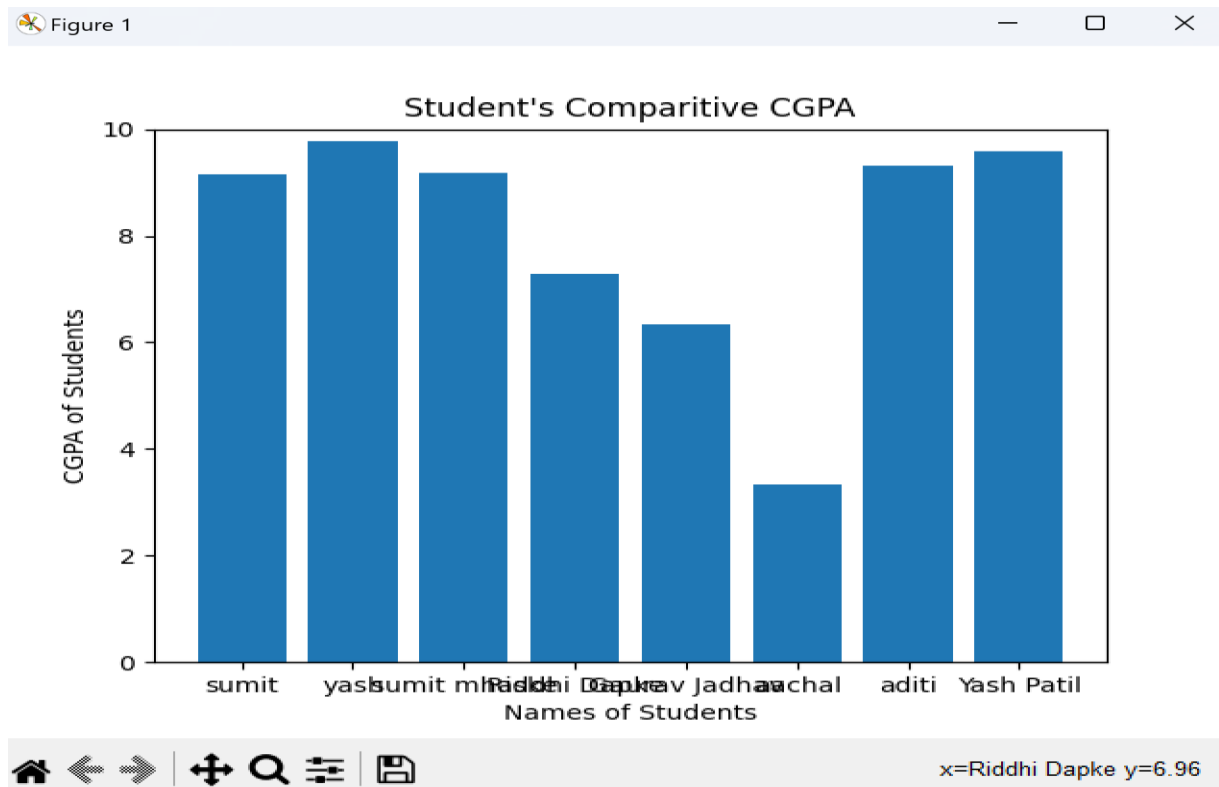
Calculate CGPA

CLEAR

SAVE

DATA

## V. Shows a bar graph to compare GPA of all students when 'Show Graph Button is Clicked.



## VII. Clearing Data from Database

Clears all the data in the database by clicking the 'Clear ALL Data' Button in Record window.



## Exception handling:

1.

VJTI GPA CALCULATOR

### CGPA CALCULATOR

Name:  Registration Number:

Course Title	Course Code	Credit	Grade Obtained
LA	R4IT3633	4	BB
DM	R4IT5691	3	AA
COA	R4IT4358	3	AB
FDS	R4IT1292	3	BB
DSLID	R4IT0981	2	AA
PD		2	AA

Your GPA is: **9.00**

**Calculate CGPA**

**CLEAR** **SAVE** **DATA**

Error  
SORRY...!!  
Data already present.  
OK

2.

VJTI GPA CALCULATOR

### CGPA CALCULATOR

Name:  Registration Number:

Course Title	Course Code	Credit	Grade Obtained
LA	R4IT3633	4	
DM	R4IT5691	3	AK
COA	R4IT4358	3	GG
FDS	R4IT1292		
DSLID	R4IT0981		AA
PD			

Your GPA is: **0.0**

**Calculate CGPA**

**CLEAR** **SAVE** **DATA**

Information  
Please choose credit and grades from following values only.  
Grades = [ 'AA', 'aa', 'AB', 'ab', 'BB', 'bb', 'BC', 'bc', 'CC', 'cc',  
'CD', 'cd', 'DD', 'dd', 'FF', 'ff' ]  
Credits = [ 1, 2, 3, 4, 0 ]  
OK

## Discussion:

The VJTI GPA Calculator project is a comprehensive tool designed to assist students in calculating their Grade Point Average (GPA) or Cumulative Grade Point Average (CGPA) based on the grades and credits they attain in their academic courses. The project encompasses a Graphical User Interface (GUI) developed using Tkinter in Python, allowing for user-friendly interaction and efficient data handling.

- Providing clear instructions and visual cues for data entry.
- Ensuring error-free calculations and immediate feedback on inputs.
- Offering a clean and organized interface for easy navigation and understanding.
- Enabling data retrieval and visualization for better insights into academic progress.

- **GUI Design:** The application is built with an intuitive interface featuring entry fields for course details such as Course Title, Course Code, Credits, and Grades Obtained.

- **Data Validation:** Ensures that users input valid grades and credits, prompting informative messages in case of erroneous inputs.

- **Calculation Engine:** Utilizes a systematic approach to calculate GPA by assigning numeric values to letter grades and applying credit weighting for each course.

- **Data Storage:** Employs SQLite3 to store student information, facilitating data retrieval for later reference.

- **Visualization:** Offers graphical representation of student CGPAs through bar graphs, providing a comparative analysis of academic performance.

- **Students:** Assist in tracking academic performance, aiding in goal setting and academic planning.

- **Educators:** Provide insights into students' progress, aiding in counseling and support initiatives.

The project demonstrates a robust implementation of GPA calculation functionality, coupled with user-friendly design and data management capabilities. As a tool geared towards academic assistance, it contributes to a streamlined process for calculating and visualizing student grades, thereby fostering a conducive environment for informed decision-making regarding academic goals and performance assessment.